LRC Wine Units Installation Bulletin

Unit Assembled By: _____

Expansion Valve Adjusted to _____psig By: _____

Receipt and Inspection

Please inspect items against the Bill of Lading. Check carefully for concealed damage prior to accepting equipment. Any damages or shortages must be reported immediately to the carrier on the receiving paperwork and LRC. Damages are the responsibility of the delivering carrier. An RMA (returned merchandise authorization) must be requested from LRC prior to return of any equipment.



WARNING: The only harmful routes of exposure for this product is through inhalation and ingestion of this product. THIS PRODUCT IS NOT DESIGNED OR MEANT TO BE INHALED OR INGESTED. The only route of exposure that this product is meant for is dermal exposure (skin contact). Consumers face no significant risk to chemicals that are known to the State of California to cause cancer and/or reproductive harm from dermal exposure to this product. For more information, go to www.Prop65Warning.ca.gov.

Cautions

DISCONNECT ELECTRICAL SERVICE PRIOR TO WORKING ON UNIT. NEVER RUN AN UNCOVERED UNIT AS INJURY MAY RESULT.

IT IS RECOMMENDED TO INSTALL SECONDARY DRAIN PANS AND WATER ALARMS WHEN INSTALLING UNITS OVER OR INSIDE ROOMS WITH HIGH VALUE OR EASILY DAMAGED FURNISHINGS/RACKING/FLOOR COVERINGS.

ALL LRC WINE ROOM EVAPORATORS ARE DESIGNED FOR INTERIOR USE ONLY. DO NOT INSTALL THE UNITS OUTSIDE.

EQUIPMENT SELECTION

Proper installation is necessary for optimum performance and customer satisfaction. Only experienced and qualified personnel who are familiar with local codes and regulations should install and maintain equipment.

Equipment, piping, and electrical installation must adhere to local and national codes as well as conform to good practices to ensure proper operation.

PLEASE NOTE: Use caution around equipment as sharp edges and coil surfaces can cause injury.

System Redundancy
Wine rooms are designed to maintain high value contents. It is important to remember that refrigeration systems are complex mechanical systems that can fail. The use of controls with alarms to notify responsible parties in the event of system degradation or failure is recommended. In addition it is advisable to consider the use of multiple smaller independent systems instead of a single larger system to provide redundancy in the event of a system failure.

Evaporator Selection
The selection of the evaporator usually revolves around the aesthetics of the wine room to be cooled. Such as units mounted in the wine rack or the center of the ceiling of the room. However it is important to note that ALL Models with the exception of the HS, VAH, RMD and CTE models are to be installed in the conditioned space. The units do not have enough insulation in the casing to prevent sweating which can damage sensitive surroundings. The HS, VAH, RMD and CTE models may be installed in either the conditioned space or unconditioned spaces in the building. Please note that all wine cellar refrigeration evaporators are for indoor installation only. For exterior mounting units must be in a weather proof casing.

Secondary Drain Pans
It is recommended that when an evaporator unit is placed over sensitive areas in an installation that a secondary drain pan be installed in the event of a condensate leak.

Condensing Unit Sizing and Configuration
This evaporator should be mated with an equivalent capacity condensing unit. The use of an oversized (or "extra capacity" over the evaporator rating) condensing unit is not recommended. The evaporator is equipped with a constant pressure expansion valve. When extra capacity is present in the system the evaporator will flood back refrigerant to the condensing unit leading to coil freeze up as well as possible compressor failure. It is better practice to undersize the condensing unit in relation to the evaporator for better system operation and reliability.

For warmer climates consider the higher ambient capabilities of the condensing unit. Smaller indoor fractional hermetic units will suffer from poor performance at high ambient temperatures due to reduced condenser coil surface. The use of indoor units in high ambient temperatures should be carefully monitored.

Refrigeration vs. AC Condensing Units – The wine room evaporators operate at temperatures/pressure below those normally seen by air conditioning compressors/condensing units. While a AC condensing unit will work for wine rooms it is recommended that a medium temperature refrigeration condensing unit be used. The lower temperatures seen in a wine room application can cause AC condensing units to operate outside the recommended ranges of the compressor manufacturer and lead to premature failure. Wine room units are typically not designed to work in areas 45 degrees F and under.

Suction Accumulators - LRC also recommends that a suction line accumulator be used to reduce the chance of liquid floodback to the compressor during off design conditions.

Line Sizing – The connection sizes of the LRC evaporators and those of the condensing unit are not necessarily the proper size for the installation. Always use the condensing unit manufacturer's recommendation for their equipment or the published ASHRAE charts. Oversizing or undersizing of the liquid and suction lines can lead to excessive energy consumption, low system performance or system failure. Always follow the guidelines for line sizing.

Line Set Runs Greater Than 25 Feet – when installing a system with line set length of greater than 25 feet be careful to follow manufacturer's recommendations regarding sizing and adding oil to the compressor. Many compressors are replaced after a short period of time due to not adding oil to a compressor when having longer line sets. Typical recommendations are 1-3 ounces of oil per 10 feet of line set over 25 feet long.

Room Construction

LRC wine room evaporator units should only be installed in areas where a vapor barrier has been installed. Failure to install a vapor barrier can and will result in the growth of mold and mildew in the walls and can lead to health problems and expensive remediation.

LRC DOES NOT RECOMMEND THE INSTALLATION OF A WINE UNIT IN A ROOM WITHOUT A VAPOR BARRIER UNDER ANY CIRCUMSTANCES.

WHILE LRC STRIVES TO PRODUCE A QUALITY PRODUCT AT ALL TIMES PROVISIONS IN THE WINE ROOM SHOULD BE LEFT FOR SYSTEM MAINTENANCE OR REPAIR BY LEAVING READY ACCESS TO THE EVAPORATOR UNIT.

LRC Coil recommends that competent architects and other wine room construction experts be consulted when designing a wine room. Construction of wine rooms with concrete walls or in underground structures should be undertaken carefully with much forethought and planning. LRC's wine units are not designed for use in humid environments where vapor barriers are not present. LRC cannot be responsible for unit operation under such conditions..

Mounting of Units

Before installing any unit, the installer must determine that the weight of the unit can be safely supported by the floor joists, rafters, racking, ceiling, etc. Care should be taken to ensure that suspension rods and other hardware be located so as to not block the access doors, interfere with the electrical, mechanical or drain functions of the units.

RM/VRM/DQ/LPQ – mount to suitable structure in the wall, ceiling or racking to ensure that the unit will not shift and possibly cause injury.

HS – the unit may be supported by the floor, joists in an attic or suspended. All suspension hardware is to be field provided and installed. Do not attempt to hang the unit from the top.

Gravity Coils – the unit is to be suspended by the mounting feet. Always ensure that there is adequate structure to support the unit at all times. The structure should be sized to handle any load that could conceivably occur with a refrigeration coil – such as a defrost/system problem that would cause the coil to freeze up solid leading to a weight increase of potentially 3-4 times the weight of the unit.

Ducting - HS Unit

The HS Unit is designed to handle a maximum of 1 inch of static pressure drop. If runs will be shorter or contain many branches then the system performance should be watched carefully during startup. If the total duct run is to be longer than 40-50 feet use larger diameter ducting to keep the maximum system static pressure losses to 1 inch total. The system is capable of being operated with the fan motor speed reduced via a speed control to bring the system performance into balance. Please note that if the fan speed is reduced the evaporator capacity will be reduced correspondingly.

In addition please remember that the unit is moving air through insulated ducting. Thermal losses should be considered in the total capacity calculation. A minimum of R-8 insulation on the ducting should be used. For areas with high humidity and where the dewpoint can be in the range of 47-50 degrees it is recommended to use extra insulation. Extra capacity should be allocated if the unit and/or ducts are located in high temperature attic areas.

For low noise installations it is advisable to use the lowest duct velocities possible to avoid transmitting sound into a wine room. The air should be moved into the room at velocities in the range of 250-500 fpm to ensure quiet operation of the overall system. Standard practices of duct construction should be used with the emphasis on staying to the low side of possible air velocities.

Ducting - VAH Unit

The VAH Unit is designed to handle 1/2 inch of static pressure drop. If runs will be short or contain many branches then the system performance should be watched carefully during startup. Use larger diameter ducting to keep the maximum system static pressure losses to 1/2 inch total. The system is capable of being operated with the fan motor speed reduced via a speed control to bring the system performance into balance. Please note that if the fan speed is reduced the evaporator capacity will be reduced correspondingly.

In addition please remember that the unit is moving air through insulated ducting. Thermal losses should be considered in the total capacity calculation. A minimum of R-8 insulation on the ducting should be used. For areas with high humidity and where the dewpoint can be in the range of 47-50 (or higher) degrees it is recommended to use extra insulation. Extra capacity should be allocated if the unit and/or ducts are located in high temperature attic areas.

For low noise installations it is advisable to use the lowest duct velocities possible to avoid transmitting sound into a wine room. The air should be moved into the room at velocities in the range of 250-300 fpm to ensure quiet operation of the overall system. Standard practices of duct construction should be used with the emphasis on staying to the low side of air velocities.

Ducting – RM/VRM

The RM/VRM series units can handle very short lengths of ducting. If ducting is to be used DO NOT use ducting of the same dimension as the outlets. The air velocity should be slowed down to 250 fpm to minimize noise and pressure losses. Also ensure that the temperature differential across the unit is set to 7-10 degrees using the fan speed control. If the temperature split is less than 7-10 degrees F slow the air down using the speed control. If higher than 7-10 degrees (after room is pulled down to setpoint) then the fan may be increased.

Configuration of Fans

Fan – the fan may be operated in 2 different ways:

1. The fans are cycled with the thermostat. This is the recommended method both operation and energy consumption point of views. Be careful to have the temperature sensing probe in a prominent location within the room. If it is in a return duct the lack of airflow will lead to erroneous readings.
2. The fan is run all the time (not recommended). In this mode it is important to ensure that the fan is turned off every 1-2 hours for a drain cycle. The high static nature of the fan will trap water in the drain pan and can lead to the overflow of the drain pan internal to the unit. A drain (or burp) cycle is important to remove the water from the drain pan area.

NOTE: running the fan all the time for HS/VAH/RM/VRM/CTIH/CTE is <u>not</u> recommended.

Multiple units – if multiple units are to be installed on a single system the units (fans/liquid line solenoid valves) should be cycled on and off together. In addition a regular TXV should be used instead of the AXV along with installing an EPR valve at the condensing unit to better hold the temperature and humidity in the room. Cycling the units independently will result in the system failure. Consult the factory if multiple units on one system are going to be cycled independently – further controls will be required to prevent system failure.

Air Flow Direction

DQ/LPA/SLA/SLPA units are equipped with dual direction on the fans as of 1/1/23. Please see wiring diagram to detail wiring changes to allow for opposite direction airflow.

Fan Speed Controls

Old legacy series HS, VAH, RM, VRM, CTE series units are equipped with motor speed controls to allow for system adjustment. Newer style units with EC Motors use other methods of speed controls – potentiometer, 0-10vdc or PWM control method. Modulating EC motors with variable voltage speed controls will burn out motors within a very short period of time.

DO NOT put a variable speed controller on EC models.

NOTE: NEVER ADJUST THE VALVE IN UNTIL IT STOPS – THIS WILL DAMAGE THE VALVE AND THE SYSTEM WILL NOT MAINTAIN THE CORRECT PRESSURES.

The unit is equipped with a constant pressure expansion valve. This is done to keep the evaporator at a constant temperature during low load conditions to prevent wide humidity swings. If necessary to adjust connect a gauge set to the lines preferably close to the evaporator as possible. Set the valve pressure to the pressure that most closely corresponds to 38-40 deg F. This pressure setting gives a coil dew point of 55-60% humidity. To adjust the valve access the expansion device either through the access hole (HS models) or by reaching into the area where the valve is located (be sure to turn off all power to the unit before locating the valve). Turn the top hex nut (10mm) clockwise to raise the suction pressure and counter-clockwise to reduce the suction pressure.

R513a refrigerant should have the valve set to 31-33 psig.
R404a refrigerant should have the valve set to 82-84 psig.
R448a refrigerant should have the valve set to 72-74 psig.
R134a refrigerant should have the valve set to 31-33 psig.

R407c refrigerant should have the valve set to 57-59 psig.

Settings other than the above may result in relative humidity levels outside the normal 50-65% range. To adjust the rooms humidity place a gauge set on the suction line near the evaporator unit and adjust the suction pressure to the desired temperature (see table below). Please note that due to large amounts of wood materials in a room it may take days for the humidity to stabilize after an adjustment.

When adjusting the expansion valve on systems that have multiple evaporators it can be difficult to get things adjusted evenly. There are 2 ways to adjust the AXV.

1. Run the system normally. Disconnect or turn off one of the LLSV's and adjust the other AXV. Reverse the process. Ensure that the system does not overpower the evaporator and skew the pressures being seen.

2. Adjust the AXV's to a pressure lower than the target suction pressure. Run the system, turn off one of the LLSV valves. Shut off the LLSV on the unit to be adjusted and let the system start to pump down. When the pressure is 20 psig or more from the target pressure shut off the compressor and adjust the AXV to bring the pressure up to the target. When the pressure is correct (it may take 1 or more cycles to adjust) then disconnect the LLSV for the unit that has just been adjusted and repeat the process for the other unit.

Humidity Note: When monitoring the humidity in the room it is very important to verify the accuracy of the device being used. The traditional Sling Psychrometer is still the most accurate way to get a humidity reading that can be trusted. If a Sling Psychrometer is not available it is recommended that 3 humidity devices be used to validate the readings. Many times decisions regarding system function are decided by a single device that is later found to be defective. . . . .

Air Temperature in Degrees Fahrenheit

Air	% Relative Humidity																		
Temp °F	100	95	90	85	80	75	70	65	60	**55**	50	45	40	35	30	25	20	15	10
80	80	78	77	75	73	71	69	67	65	62	59	56	53	50	45	40	35	32	
75	75	73	72	70	68	66	64	62	60	58	55	52	49	45	41	36	32		
70	70	68	67	65	63	61	59	57	55	53	50	47	44	40	37	32			
65	65	63	62	60	59	57	55	53	50	48	45	42	40	36	32				
60	60	58	57	55	53	52	50	48	45	43	41	38	35	32					
55	55	53	52	50	49	47	**45**	**43**	**40**	**38**	**36**	**33**	32						
50	50	48	46	45	44	42	40	38	36	34	32								
45	45	43	42	40	39	37	35	33	32										
40	40	39	37	35	34	32													
35	35	34	32																

CAUTION

Do not operate the unit with an oversize condensing unit. If the unit is operated in this manner the coil may freeze and cause low humidity in the wine room and/or lack of airflow leading to over temperature conditions in

the room or compressor failure due to floodback. Always size the condensing unit to the evaporator at the lowest ambient temperatures the system will be operated if a fan cycling switch is not installed for low ambient conditions. Or size matches the condensing unit at the higher ambient conditions and install head pressure controls (fan cycling, head pressure) to ensure that the condensing unit's capacity is relatively constant throughout the year.

Control Logic

For most applications the standard refrigeration pump down approach to control will work just fine. The condensing unit is equipped with an adjustable low pressure switch that is set for 25-30 degrees (equivalent pressure) below the set point. The controller then controls the 115vac solenoid valve on the evaporator. When the unit is running the pressure/temperatures will be within range. When the temperature setting is satisfied then the liquid line solenoid valve will close. After the refrigerant in the evaporator boils off the suction pressure will begin to pump down. When the suction pressure goes below the set point on the low pressure switch then the condensing unit will shut down. When the room temperature rises above the set point the solenoid valve opens, and the coil is flooded with refrigerant and the pressure rises above the reset point and the system starts back on line. The control system should be programmed to keep the liquid line solenoid (and therefore the compressor) from cycling within 3 minutes. This is to keep the system from short cycling and burning out the compressor.

Configuration of Condensing Unit

Low pressure switch setting should be approximately 25-30 psi below the set point.

It is assumed that a standard equipment setup on the condensing unit will be used. Suction accumulator, sight glass, receiver, liquid line filter and high pressure switch. For long runs or installation of the condensing unit in areas that can see large swings of temperature it is recommended that a head pressure control valve be used for system reliability.

Airflow Considerations

NOTE: FOR ALL RM/VRM/HS/VAH WINE UNITS IT IS IMPORTANT TO VERIFY THE TEMPERATURE DIFFERENTIAL ACROSS THE UNIT IS IN THE 7-10 DEGREE RANGE. TOO MUCH AIR CAN CAUSE WATER TO BLOW OFF THE COIL AND INTO DUCTING OR OTHER PARTS OF THE UNIT. THE 7-10 DEGREE TEMPERATURE DIFFERENTIAL MUST BE MAINTAINED.

The wine room evaporators are designed to be located in the room to be cooled. For the RM unit it is permissible to duct the incoming and exiting are several feet. However care should be taken to make sure that the ducting does not restrict the airflow or the system may not perform properly. Maximum air velocity for small duct runs for RM/VRM units is 250fpm. For WM/DQ/LPAQ/CE/CTI/CTE models, ducting is not recommended.

Nominal system temperatures should be a 38 degree evaporator with the leaving air temperature at the duct spud of 45-48 degrees (with a 55 degree room). For rooms that do not have a 55 degree set point the temperature across the air handler should be 7 -10 degrees F. Higher temperature splits are indicative of too little airflow. Lower temperature differentials are indicative of too much airflow.

For installations where the maximum humidity is desired to be maintained to a specific level the expansion valve may be adjusted up or down to achieve the desired level. In cases where the expansion valve is adjusted please ensure that the coil temperature does not drop to below 32 Deg F or coil freeze up may result.

Grills
When using grills at the entrance to ducting or units it is advisable to review the total amount of open area available. Many grills have an open area of only 50% of the face area of the grill. Always review the amount of grill open area in relation to the duct area. In many cases it may be necessary to increase the grill size by 2-3 times the duct area to get enough grill area to not restrict the airflow. Please remember that the restriction from a grill may be enough to choke off the unit's performance.

Air Filters
It is recommended to place a low restriction air filter on the air inlets of all evaporators/ducts to prevent the build up of lint on the coil.

Drain Line
Equipment must be installed level or with a slight angle toward the drain connection (maximum of ½ inch from end to end). Plastic or metal drain lines should be installed with a minimum pitch of 1/4" per foot slope. All condensate water must be disposed of properly in accordance with local codes and ordinances. Do not allow condensate water to accumulate or become a safety or biological hazard.

NOTE: On HS/VAH units a "P" trap (such as those used on sinks) must be installed. The P Trap should have a minimum of 2 inches of drop to act as a seal to the vacuum in the evaporator. In cases of multiple units attached to a common drain line a vent should be used to prevent the other units from affecting the condensate drainage from the other units.

Motors
Motors are lubricated for life and are thermally protected. Verify an inoperative motor by checking the voltage across the leads. If the motor fails to operate, replace the motor. For LPA/DQ/CE/CTI/WM models the hesitation of the motor at startup is normal. Do not use a speed control on the above models – motor failure will result.

Wiring
The nameplate contains the units electrical characteristics. The unit MUST be properly grounded and all wiring should be in accordance with applicable local and national codes.

Maintenance
Remote Unit Air Filters - The HS/VAH/RM/VRM/CTI/CTE wine unit evaporators are not equipped with an air filter due to the remote nature of the installation. LRC recommends that an air filter be installed in an easily accessible area to minimize the dirt and lint build up on the coil.

All Evaporators - the unit should be periodically inspected for lint and soil accumulation. The time frame for inspections should be on a 1 month basis during initial system installation and commissioning and no less than quarterly for units for proper unit operation. Based on the results seen in that particular installation the interval may be adjusted to reflect actual installation conditions. The coil should be cleaned using neutral pH type cleaners at least 2 times a year to prevent acetic acid from wine vapors from building up on the coil and lead to

premature coil failure. Acidic or Alkaline cleaners can remove the coil and pan coating and lead to system failure. Inspect drain pan and fan areas for proper condensate drainage.

All LRC wine units have a coated coil and SS drain pan. The coating is hydrophobic (repels water) and anti-microbial (prevents bacterial/algae growth). If cleaning is needed use only neutral pH cleaners. Use of alkaline or acidic cleaners will strip the coating from the coating and void any warranties.

Replacement Parts
LRC Coil Co. recommends the use of authorized factory parts to maintain this unit. The use of non factory parts can lead to possible safety or performance issues. Contact LRC Coil for replacement parts. Please be prepared to provide complete model and serial numbers when ordering parts.

Defrost/Drain Cycle
The unit does not require a defrost cycle since by design the coil does not go below freezing. However if the fan is always left on a drain cycle must be included in the daily operation to ensure that the drain pan can be empty of water. At least 1 time per 2 hours the fan should be cycled off for at least 1 minute to allow time for water to drain from the unit.

Drain Pan
The unit is equipped with an internal drain pan. In the event that the unit is installed over an occupied area or above sensitive contents LRC recommends that a secondary drain pan be installed. For assistance with secondary drain pans contact the Factory.

Controls –
Simple Thermostat – Wire thermostat to the solenoid valve and fan motor. The condensing unit and fan will cycle on it's own adjustable low pressure switch (pump down type of system).

For installations where the unit is located in an area that could suffer major damage in the event of a drain pan overflow it is recommended that a secondary drain pan be utilized with a water sensor in series with the fan or a remote control device to signal a problem with the unit.

Note on Temperature Controls: For Fan Always On conditions it is best to put the temperature probe of the controller into the return air duct for best results. For systems where the fan and/or condensing unit cycles with the thermostat a sensor is better placed in the room in a location that will allow good airflow. LRC does not recommend the use of a wine bottle filled with water with a probe inside. This type of sensing system can cause wide swings of the wine room air temperature in order to stay within the resolution of the temperature controller. These swings can be drastic enough to cause damage to the wine over time.

TROUBLE SHOOTING

Temperature Split – Design Intent

When troubleshooting a wine room refrigeration system please keep in mind that all LRC wine room evaporators have been designed to operate with a 38 degree coil (saturated temperature), 45-48 degree leaving air temperature and a 55 degree room (inlet air temp). At this point the humidity in the room will maintain a maximum of 55-65%. The final humidity level will be determined by the suction temperature that the AXV is maintained at – therefore it's possible to "tune" the maximum humidity in the room after a room has been commissioned.

Complaint – coil freezing up

- Check suction pressure. Equivalent pressure for all refrigerants should be 38 degrees (with 55 degree room) or 17 degrees below that of the desired room temperature.
    - Adjust constant pressure expansion valve.
- If unable to move the suction pressure to desired setpoint.
    - Review condensing unit sizing in relation to the evaporator capacity. Possible causes are that the condensing unit has too much capacity and thus is overpowering the expansion valve. This can be resolved by installing head pressure controls/fan cycling switch.
    - Expansion valve may be faulty – contact factory.

Complaint - Suction Line is frosty back to the condensing unit

- Review condensing unit sizing in relation to the evaporator capacity. Possible causes are that the condensing unit has too much capacity and thus is overpowering the expansion valve. Install a fan cycling switch to raise the head pressure of the system to a point equal to a warm summer day to detune the condensing units capacity.
- Check airflow for restriction or the proper amount. Low airflow can cause a properly sized system to under-perform and frost up the suction line. Increase airflow through the unit.

Complaint - Suction pressure is too low (less than 38 degrees) –

- Adjust the AXV valve to the saturation pressure that is equivalent to 38 degrees (i.e. 63 psig for R22, 33 psig for R134a, 84psig for R404a).
    - Note: the adjustment nut is a 10mm hex. Do not remove the larger brass nut on the opposite end of the valve or failure of the valve will result.
    - Note: the adjustment nut is accessible from the outside of the unit on the HS series units.
- Check refrigerant charge level. Ensure that there is no flashing in the sight glass. Low charge will lead to improper cooling of the room due to lack of liquid plug at the AXV. High head pressure will also result due to poor mass refrigerant flow back to the compressor.
- - If unable to adjust the pressure on the system (the suction pressure remains too low) please contact the factory.

Complaint - Wine Room Temperatures are too high

If the room temperature is not satisfying check the system pressures and temperatures

Evaporator temperature should be 38 degrees (+/- 1-2 degrees)

Air temp. should be 45-48 deg. leaving/55 deg. entering for a 7 degree split

- For HS/VAH units if the split is less than 8 degrees the most likely cause is too much airflow (too little restriction of the system). If this is occurring a motor speed control should be adjusted and the motor slowed down until the 8-10 degree split is achieved.
- For HS/VAH units if the split is greater than 7 degrees the ducting should be examined for restrictions. While the unit will still operate with larger splits there may be ramifications to the room humidity.
- For other units without ducting the temperature differences should be 7-10 degrees by design. Contact the factory for situations where this is occurring.
- Check that line sizing is proper for the installation. Improper line sizing will affect oil return to the compressor if oversized or too much pressure drop on the suction line which can lead to room temperatures being too warm.
- Check the rating of the condensing unit. When small indoor type units are used in outdoor application with an enclosure situations may arise where high ambients can degrade compressor performance to the extent the system cannot keep up with demands.
- Check the length of the duct run to ensure that the running of ducting through unconditioned space is not degrading the performance of the system – the air is warming up in the duct run causing the system to not perform.

Note: Please note that if the unit is running 100% of the time and the room is not cooling please consider the possibility of a vapor barrier not being present and moisture is migrating into the room. A quick test is to install a bucket or other container on the drain line for the unit. If a vapor barrier is not present in the room the condensate will continue to build up. For rooms with a proper vapor barrier installation very little condensate should build up. The second possibility is that the unit selected is too small and cannot provide the needed cooling. Please revisit the design assumptions for the system.

Complaint - Unit "leaking water" –

For RM/VRM/HS/VAH/CTI/CTE units "leaking water from the base of the unit or water building up in the ducts is symptomatic of the unit not having enough static pressure restriction on the system and is flowing too much air. This problem will also show up as the room not cooling or the temperature split across the unit as being less than the desired 8-10 degrees.

- Check to ensure that there is a ¼ inch per foot of slope of the unit toward the drain fitting.
- Adjust the motor speed control on the fan to bring the airflow down to achieve a 7-10 degree split across the unit.
- Ensure that there is a drain cycle/burp cycle to allow the water to drain from the unit. The drain pan can overflow if a drain cycle is not included when fans are always on.

Complaint - Humidity is Oscillating/YoYo'ing

For rooms where the humidity is not stable (+/- 5% rh)

- Check that the expansion valve is set to 38 degrees.
- Make sure the unit fan cycles on with and off with the thermostat. Fan On all the time will lead to humidity oscillation.

Complaint - Humidity too low

- Adjust the suction pressure of the system using the AXV as detailed in "Adjusting AXV" section.

Complaint - High Condensing Pressure

- Check refrigerant charge level. Ensure that there is no flashing in the sight glass. Low charge will lead to improper cooling of the room due to lack of liquid plug at the AXV. High head pressure will also result due to poor refrigerant mass flow back to the compressor.

Complaint - Small Temperature Split Across the Unit (1-2 degrees)

- Charge Check - Check sightglass – must be bubble free – if not add charge to bring up to a condensing pressure 35 degrees above ambient. Add charge as necessary to achieve 35 deg differential between ambient and condensing pressure. AXV's have the capability of passing adequate mass flow of hot gas refrigerant and it appears to be functioning but with only minimal cooling effect.
- Compressor Check - If suction pressure and condensing pressures appear to be normal but still getting inadequate cooling take the amp reading on the compressor. Based on the ambient/condensing temperature check the power consumption to the manufacturer's charts. If amps are low – replace compressor/condensing unit.
- Speed Control – for units with integrated speed controls the failure mode is to fail on full – giving maximum airflow. Replace speed control ensuring that the unit is placed on the line input side of the motor (not the neutral side).

LRC Coil Company
Warranty

We're proud of the workmanship that goes into every LRC product. Because of our exacting design and manufacturing standards, and our thorough testing prior to shipping, we unconditionally guarantee our products to be free from manufacturing defects for one year.
Note: You must contact the factory at (562) 944-1969 with regard to all warranty issues. Failure to contact LRC prior to servicing the equipment may void the warranty.

LRC Coil's Limited Warranty

LRC Coil Company (also known as "Seller") warrants against defects in material and workmanship for a period of 1 year from date of installation or up to 24 months from date of shipment when the equipment has been properly stored and/or installed and is in normal service. Warranty form must be filed online within 30 days of installation for the 1 year warranty to be valid past the 1 year shipment date. Warranty form will be filled out on http://lrccoil2.com/warranty/warranty_form.php. Seller's obligation under this warranty shall be limited to replacing or repairing any part returned to the seller within the warranty period, transportation charges prepaid, along with return shipping instructions and collect return shipping charges, and it is proved to the seller's satisfaction that the part/product is inherently defective.

This warranty shall not apply to products which have been improperly installed, repaired, or altered in any way outside of the seller's factory, or products that have been subject to misuse, negligence, accident, or operated contrary to installation guidelines. Seller shall not be held liable for repairs made by the purchaser except by prior written authorization. Parts not manufactured by the seller such as motors, valves, or other items shall carry the manufacturer's warranty.

Any implied warranty of merchantability or fitness for a particular purpose or use, shall be limited to the duration of the foregoing limited written warranty. Otherwise, the foregoing limited warranty is the buyer's sole and exclusive remedy and is in lieu of all other warranties, express or implied. Seller shall not be liable for special, incidental or consequential damages, including but not limited to, loss of anticipated benefits or profits, loss of savings or revenue, punitive damages, loss of use of the product or any associated equipment, cost of capital, cost of any substitute equipment or facilities, downtime, the claims of any third parties including customers, injury to property resulting from the purchase or use of the product or arising from breach of the warranty, breach of contract, negligence, strict tort, or any other legal or equitable theory, even if LRC Coil Company was aware of the likelihood of such damages. LRC Coil Company shall not be liable for loss of use during the period that the product is being repaired.

Line Set Sizing Chart - LRC Wine Evaporators

Line Sizing Chart – Liquid Line Sizing @ 120 Deg Condensing. PSIG/100' Pressure Drop.

Liquid Line		3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	7/8"
R134a	**1000**	1.5	0.2						
	1500	3	0.5						
	2000	4.9	0.7	0.2					
	2500	7.3	1.1	0.3					
	3000	10.1	1.5	0.4					
	3500	13.2	2	0.5					
	4000	16.8	2.5	0.7					
	4500	20.7	3	0.8					
	5000		3.7	1	0.3				
	5500		4.3	1.2	0.4				
	6000		5.1	1.4	0.5				
	6500		5.8	1.6	0.6				
	7000		6.6	1.8	0.6				
	7500		7.5	2.1	0.7				
BTUH	**8000**		8.4	2.3	0.8				
Evap.	**8500**		9.4	2.6	0.9				
Capacity	**9000**		10.4	2.9	1				
	9500		11.5	3.1	1.1				
	10000		12.6	3.4	1.2				
	10500			3.8	1.3	0.3			
	11000			4.1	1.4	0.3			
	11500			4.4	1.5	0.3			
	12000			4.8	1.6	0.3			
	12500			5.1	1.7	0.4			
	13000			5.5	1.9	0.4			
	13500			5.9	2	0.4			
	14000			6.2	2.1	0.5			
	14500			6.7	2.3	0.5			
	15000			7.1	2.4	0.5			
	15500			7.5	2.6	0.5			
	16000			8	2.7	0.6			
	16500			8.4	2.9	0.6			
	17000			8.9	3	0.6			
	17500			9.4	3.2	0.7			
	18000			9.9	3.3	0.7			
	18500				3.5	0.7	0.2		
	19000				3.7	0.8	0.2		
	19500				3.9	0.8	0.3		
	20000				4	0.8	0.3		

Line Sizing Chart – R134a, Suction Line Sizing @38 deg ST. PSIG/100' Pressure Drop.

Suction Line		1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	7/8"	1 1/8"
R134a	**1000**		2.2	0.8	0.2				
	1500			1.6	0.3	0.1			
	2000			2.6	0.6	0.2			
	2500			4	0.8	0.3			
	3000			5.5	1.1	0.4			
	3500				1.5	0.5	0.2		
	4000				1.9	0.6	0.2		
	4500				2.4	0.8	0.3		
	5000				2.9	0.9	0.4		
	5500				3.4	1.1	0.4		
	6000				4	1.3	0.5		
	6500					1.5	0.6	0.3	
	7000					1.7	0.7	0.3	
	7500					1.9	0.8	0.3	
	8000					2.2	0.8	0.4	
BTUH	**8500**					2.4	0.9	0.4	
Evap.	**9000**					2.7	1.1	0.5	
Capacity	**9500**					2.9	1.2	0.5	
	10000					3.2	1.3	0.5	
	10500						1.4	0.6	0.2
	11000						1.5	0.7	0.2
	11500						1.6	0.7	0.2
	12000						1.8	0.8	0.2
	12500						1.9	0.8	0.2
	13000						2.1	0.9	0.2
	13500						2.2	0.9	0.3
	14000						2.4	1	0.3
	14500						2.5	1.1	0.3
	15000						2.7	1.2	0.3
	15500						2.8	1.2	0.3
	16000						3	1.3	0.4
	16500						3.2	1.4	0.4
	17000							1.4	0.4
	17500							1.5	0.4
	18000							1.6	0.4
	18500							1.7	0.5
	19000							1.8	0.5
	19500							1.9	0.5
	20000							2	0.5

All pressure losses (psig) are per 100 feet of the line size specified.

Line Sizing Chart – R513a, Liquid Line Sizing @ 120 Deg Condensing. PSIG/100' Pressure Drop.

LIQUID		3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	7/8"	1 1/8"
R513a	**1000**	21.5333	2.53333	0.63333						
	1500	20.2	2.5	0.65						
	2000	18.8667	2.46667	0.66667						
	2500	17.5333	2.43333	0.68333						
	3000	16.2	2.4	0.7						
	3500	14.9	2.4	0.7						
	4000	13.5	2.3	0.7						
	4500	12.2	2.3	0.8						
	5000	10.9	2.3	0.8						
	5500	9.5	2.2	0.8						
	6000	8.2	2.2	0.8						
	6500			1.4						
	7000			2.1						
	7500			2.7						
	8000			3.3						
BTUH	**8500**			4.0						
Evap.	**9000**			4.6	1.6	0.3				
Capacity	**9500**			5.1	1.8	0.3				
	10000			5.7	1.9	0.4				
	10500			6.2	2.1	0.4				
	11000			6.7	2.3	0.4				
	11500			7.3	2.4	0.5				
	12000			7.8	2.6	0.5				
	12500			8.4	2.8	0.6				
	13000			9.1	3.0	0.6				
	13500			9.7	3.3	0.7				
	14000			10.3	3.5	0.7				
	14500			11.0	3.7	0.8				
	15000			11.6	3.9	0.8				

All pressure losses (psig) are per 100 feet of the line size specified. To calculate the losses for a 40-foot line set. Calculate by 40 divided by 100, which equals 0.4 times the pressure drop. Ideal pressure drop is 1 to 2° for the evaporator.

Line Sizing Chart – R513a, Suction Line Sizing @ 38 Degree ST. PSIG/100' Pressure Drop.

SUCTION		3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	7/8"	1 1/8"
	1000				2.8	0.63	0.13	0.03		
	1500				5.3	1.1	0.3	0.1		
	2000				7.8	1.57	0.47	0.17		
	2500				10.3	2.03	0.63	0.23		
	3000				12.8	2.5	0.8	0.3		
	3500				15.3	3.0	1.0	0.4		
	4000				17.8	3.4	1.1	0.4		
	4500				20.3	3.9	1.3	0.5		
	5000				22.8	4.4	1.5	0.6		
	5500				25.3	4.8	1.6	0.6		
	6000				27.8	5.3	1.8	0.7	0.3	
	6500					6.3	2.1	0.8	0.4	
	7000					7.2	2.4	0.9	0.4	
	7500					8.2	2.8	1.0	0.4	
	8000					9.2	3.1	1.2	0.5	
BTUH	**8500**					10.1	3.4	1.3	0.5	
Evap.	**9000**					11.1	3.7	1.4	0.6	
Capacity	**9500**						4.1	1.6	0.7	
	10000						4.6	1.7	0.8	
	10500						5.0	1.9	0.9	
	11000						5.4	2.1	0.9	
	11500						5.9	2.2	1.0	
	12000						6.3	2.4	1.1	0.3
	12500						6.9	2.6	1.2	0.3
	13000						7.4	2.8	1.3	0.3
	13500						7.9	3.0	1.4	0.4
	14000						8.5	3.2	1.4	0.4
	14500						9.0	3.4	1.5	0.4
	15000						9.6	3.6	1.6	0.4
	15500						10.3	3.8	1.7	0.4
	16000						10.9	4.1	1.8	0.5
	16500						11.6	4.3	1.9	0.5
	17000						12.2	4.5	2.0	0.5
	17500						12.9	4.8	2.1	0.6
	18000						13.5	5.0	2.2	0.6
	18500							7.8	2.3	0.6
	19000							10.7	2.5	0.6
	19500							13.5	2.6	0.7
	20000							16.3	2.7	0.7

All pressure losses (psig) are per 100 feet of the line size specified.

Line Sizing Chart – R404a, Liquid Line Sizing @120 Deg Condensing. PSIG/100' Pressure Drop.

LIQUID		3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	7/8"	1 1/8"
R404a	**1000**	2.7	0.4							
	1500	5.5	0.8							
	2000	9.2	1.4	0.4						
	2500	13.8	2	0.6						
	3000	1.2	2.8	0.8						
	3500	25.3	3.7	1						
	4000	32.3	4.6	1.3						
	4500	5.7	1.6	0.5						
	5000		6.9	1.9	0.6					
	5500		8.2	2.3	0.8					
	6000		9.7	2.6	0.9					
	6500		11.2	3	1					
	7000		12.8	3.5	1.2					
	7500		14.5	3.9	1.3					
	8000		16.3	4.4	1.5					
BTUH	**8500**		18.2	4.9	1.7					
Evap.	**9000**		20.2	5.5	1.8					
Capacity	**9500**			6	2	0.4				
	10000			6.6	2.2	0.5				
	10500			7.2	2.4	0.5				
	11000			7.9	2.6	0.6				
	11500			8.5	2.9	0.6				
	12000			9.2	3.1	0.6				
	12500			9.9	3.3	0.7				
	13000			10.7	3.6	0.7				
	13500			11.4	3.8	0.8				
	14000			12.2	4.1	0.9				
	14500			13	4.4	0.9				
	15000			13.9	4.6	1				
	15500			14.7	4.9	1				
	16000			15.6	5.2	1.1				
	16500			16.5	5.5	1.1				
	17000				5.8	1.2	0.4			
	17500				6.1	1.3	0.4			
	18000				6.5	1.3	0.4			
	18500				6.8	1.4	0.4			
	19000				7.1	1.5	0.5			
	19500				7.5	1.6	0.5			
	20000				7.8	1.6	0.5			

All pressure losses (psig) are per 100 feet of the line size specified.

Line Sizing Chart – R404a, Suction Line Sizing @ 38 Degree ST. PSIG/100' Pressure Drop.

SUCTION		3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	7/8"	1 1/8"
R404a	**1000**		7	1.9	0.6					
	1500			4	1.3	0.3				
	2000			6.7	2.2	0.5				
	2500				3.4	0.7	0.2			
	3000				4.7	1	0.3			
	3500				6.3	1.3	0.4			
	4000				8	1.6	0.5			
	4500				10	2	0.6			
	5000				12.1	2.5	0.8			
	5500					2.9	0.9	0.4		
	6000					3.5	1.1	0.4		
	6500					4	1.3	0.5		
	7000					4.6	1.4	0.6		
	7500					5.2	1.6	0.6		
	8000					5.9	1.9	0.7		
BTUH	**8500**					6.6	2.1	0.8		
Evap.	**9000**					7.3	2.3	0.9		
Capacity	**9500**						2.5	1	0.4	
	10000						2.8	1.1	0.5	
	10500						3	1.2	0.5	
	11000						3.3	1.3	0.6	
	11500						3.6	1.4	0.6	
	12000						3.9	1.5	0.7	
	12500						4.2	1.6	0.7	
	13000						4.5	1.8	0.8	
	13500						4.9	1.9	0.8	
	14000						5.2	2	0.9	
	14500						5.5	2.2	0.9	
	15000						5.9	2.3	1	
	15500						6.3	2.4	1	
	16000							2.6	1.1	0.3
	16500							2.7	1.2	0.3
	17000							2.9	1.2	0.3
	17500							3.1	1.3	0.4
	18000							3.2	1.4	0.4
	18500							3.4	1.4	0.4
	19000							3.6	1.5	0.4
	19500							3.8	1.6	0.4
	20000							3.9	1.7	0.5

All pressure losses (psig) are per 100 feet of the line size specified.

Line Sizing Chart – R448a, Liquid Line Sizing @120 Deg Condensing. PSIG/100' Pressure Drop.

LIQUID		3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	7/8"	1 1/8"
R22	1000									
	1500									
	2000		0.27	0.1						
	2500		1.03	0.3						
	3000	12.6	1.8	0.5						
	3500		2.6	0.7						
	4000		3.3	0.9						
	4500		4.1	1.1						
	5000		4.9	1.3						
	5500		5.6	1.5						
	6000		6.4	1.7	0.6					
	6500		7.5	2.0	0.7					
	7000		8.7	2.3	0.8					
	7500		9.8	2.7	0.9					
	8000		10.9	3.0	1.0					
BTUH	8500		12.1	3.3	1.1					
Evap.	9000		13.2	3.6	1.2					
Capacity	9500		14.7	4.0	1.3					
	10000		16.3	4.4	1.5					
	10500		17.8	4.9	1.6					
	11000		19.3	5.3	1.7					
	11500		20.9	5.7	1.9					
	12000		22.4	6.1	2.0					
	12500			6.6	2.2					
	13000			7.1	2.4					
	13500			7.6	2.6					
	14000			8.1	2.7					
	14500			8.6	2.9					
	15000			9.1	3.1	0.6				
	15500			9.7	3.3	0.6				
	16000			10.3	3.5	0.7				
	16500			10.9	3.7	0.7				
	17000			11.5	3.8	0.7				
	17500			12.1	4.0	0.8				
	18000			12.7	4.2	0.8				

All pressure losses (psig) are per 100 feet of the line size specified.

Line Sizing Chart – R448a, Suction Line Sizing @ 38 Degree ST. PSIG/100' Pressure Drop.

SUCTION		3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	7/8"	1 1/8"
	1000									
	1500									
	2000				1					
	2500				2.65					
	3000				4.3	0.3	0.1	0		
	3500				5.95	0.75	0.25	0.07		
	4000				7.6	1.2	0.4			
	4500				9.3	1.7	0.6			
	5000				10.9	2.1	0.7			
	5500				13.7	2.6	0.9			
	6000				16.5	3.1	1.1	0.4		
	6500				19.6	3.7	1.3	0.5		
	7000				22.7	4.3	1.5	0.5		
	7500				25.9	4.9	1.7	0.6		
	8000				29.0	5.4	1.8	0.7		
BTUH	8500				32.1	6.0	2.0	0.7		
Evap.	9000				35.2	6.6	2.2	0.8		
Capacity	9500					7.4	2.5	0.9		
	10000					8.2	2.7	1.0		
	10500					9.0	3.0	1.1		
	11000					9.7	3.3	1.2		
	11500					10.5	3.5	1.3		
	12000					11.3	3.8	1.4	0.6	
	12500					12.3	4.1	1.5	0.7	
	13000					13.3	4.4	1.6	0.7	
	13500					14.3	4.8	1.8	0.8	
	14000					15.2	5.1	1.9	0.9	
	14500					16.2	5.4	2.0	0.9	
	15000					17.2	5.7	2.1	1.0	
	15500						6.1	2.3	1.1	
	16000						6.5	2.4	1.1	
	16500						6.9	2.6	1.2	
	17000						7.2	2.7	1.2	
	17500						7.6	2.9	1.3	
	18000						8.0	3.0	1.3	0.4
	18500						8.4	3.2	1.4	0.4
	19000						8.9	3.3	1.5	0.4
	19500						9.3	3.5	1.5	0.4
	20000						9.7	3.6	1.6	0.4

All pressure losses (psig) are per 100 feet of the line size specified.

Notes